

SOP Group F  
Revision 0.0

**SOP Group F  
Standard Operating Procedures  
For Sewer Gas Vapor Sampling Activities**

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**Appendix A - Air Sampling Field Data Sheet**

## SOP Group F Standard Operating Procedures For Sewer Gas Sampling Activities

### Introduction

This standard operating procedure (SOP) sets forth the criteria and guidelines used to obtain sewer gas samples for analysis of volatile organic compounds (VOCs). All sewer gas samples will be collected using summa canister sampling kits provided by the contract laboratory.

When evaluating the vapor intrusion exposure pathway, potential sampling methods and locations include sewer gas vapor sampling (SWG). When performing these sampling activities under the direction of a regulatory agency, the sampling methods and locations should be discussed and approved by the regulatory project manager prior to implementing the work activities.

In general, 1-liter stainless steel summa canisters are utilized when obtaining grab SWG samples and are typically obtained over a 5-10-minute period of time; however, site-specific sampling requirements may require alternative summa canister sizes and/or sampling times.

The Air Sampling Field Data Sheet provided in **Appendix A** should be completed when conducting the sampling activities.

### SOP F.1 Sewer Gas Vapor Sampling

SWG samples will be submitted to the contract laboratory for TO-15 laboratory analysis. **The recommended sample container is a 1-liter summa canister equipped with a flow regulator calibrated to a sampling rate of 100 mL/minute. This will equate to a total sampling time of 10 minutes.** The sampling and screening procedures shall include the following:

1. The contract laboratory will provide certified clean summa canister sampling kits which will include a 1-liter summa canister, sampling inlet line with fittings, filter, and flow regulator (set for approximately 10 minutes for 1-liter canisters). The summa canisters and flow regulators will be tagged with matching serial numbers provided by the laboratory.
2. Prior to initiating the sampling activities and utilizing the laboratory provided summa canisters, the vacuum of each summa canister and the leak integrity of the canister and regulator should be checked via the “shut-in test” by opening the valve of the summa canister while the cap is still on the sampling port of the summa canister then closing the valve. The observed vacuum on the canister vacuum gauge should exhibit no change after 1 minute. If the observed vacuum

changes, the cap, connection fittings, and/or regulator will be re-tightened, then if necessary, reseated, tightened, and retested. Additionally, the observed vacuum should be within 4-inches of mercury from the lab recorded vacuum prior to shipment from the laboratory. The laboratory will provide the user of the summa canisters the lab recorded vacuum for each canister and if there is >4-inches of mercury difference, the integrity of the summa canister is questionable, and the summa canister cannot be utilized for the sampling activities.

3. Prior to initiating the sampling activities and utilizing the appropriate sampling train, a leak test of the sampling set-up should be performed. Attach the Nyaflow tubing (or Teflon lined tubing) to the canister regulator with the provided Swagelok ferrules and attach a medium length piece of Tygon tubing to the Nyaflow tubing and to a hand-held vacuum pump with a pressure gauge and stopcock. Induce a vacuum of at least 15-inches of mercury on the sample sampling set-up with the stopcock open and then close the stopcock. The observed vacuum on the pressure gauge should exhibit no change after 1 minute. If the observed vacuum changes, tighten the Swagelok connection for the canister regulator and Nyaflow tubing and retest. If the observed vacuum does not change, the sampling set-up is tight and the Tygon tubing will be cut short for subsequent sampling. **Do not remove or adjust the remaining sampling train after the sampling train has been verified tight.**
4. Prior to initiating the sample collection phase of the sampling event, the sampling location manhole will be opened approximately 3 to 6 inches to minimize any ambient air influence. Measurements of the invert, top of sewer pipe, and top of water flowing within the sewer elevations to the rim of the manhole will also be obtained, if feasible.
5. Following the manhole measurements, Nyaflow tubing will be prepared with an attached weight or be attached to an extendable rod and lowered so that the end of the tubing is halfway between the top of the water within the sewer and the top of the sewer pipe. Approximately three (3) times the “dead volume” of air within the sampling tubing should be slowly (~100 to 200 mL/minute) purged from the tubing. **Generally, one (1) volume of air from the sampling tubing (assuming ¼-inch diameter) is approximately 5 mL per foot of tubing.** The air can be purged using an SKC Airchek sampler set at a rate of 0.1 liters per minute, an RKI GX-6000 multi-gas PID monitor (or equivalent), or from a graduated syringe. The purged air will be removed from the tubing and discharged into the atmosphere or temporarily into a 1 or 2-liter tedlar bag. The temporarily stored purged air (either from the syringe or tedlar bags) should then be released to the atmosphere once outside the structure, preferably in a downwind location from the structure. Measure and record the purge rates and volumes. Measure and record the stabilized lower explosive limit (LEL), O<sub>2</sub>, and PID readings if using the RKI GX-6000 multi-gas PID monitor. **If possible, the sewer manhole will be completely closed (or as close to it as possible) prior to sampling in order to minimize ambient air influence.**

6. Prior to sample collection the appropriate information will be completed on the Air Sampling Field Data Sheet provided in **Appendix A**. The canister will be equipped with a pre-determined time flow regulator and connected to the sampling tubing via the short piece of Tygon tubing. The summa canister and flow regulator will be opened and the pressure differential will cause the air sample to enter the canister at the pre-determined flow rate. The vacuum applied by the summa canister during the sampling events should be as low as possible. The sampling activities are complete when the vacuum on the summa canister is between approximately 3 and 5-inches of mercury or the pre-determined timeframe is reached, whichever occurs first. Care should be taken as to not allow the vacuum to reach zero.
7. Upon completion of the sampling time, shut off the flow regulator and record the appropriate information on the Air Sampling Field Data Form. Remove the sampling train from the summa canister, tightly secure the cap on the summa canister, and ship the sampling kit back to the contract laboratory following typical chain of custody protocols. Confirm that the sampling kit serial numbers all match prior to delivery to the laboratory.
8. Be certain to record the initial and final canister pressures, start and stop times for canister filling, and appropriate canister pressure checks during sampling

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**Appendix A**  
**Air Sampling Field Data Sheet**

## Air Sampling Data Sheet

VI Sampling Event Date: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Project: \_\_\_\_\_

Building HVAC Status: \_\_\_\_\_

Building Site Address: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_      Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_      Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_ Sample Height / Depth (ft.): \_\_\_\_\_ Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_      Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_      Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_ Sample Height / Depth (ft.): \_\_\_\_\_ Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_\_

Sample ID	Sampling Location	Sampling Time		Vacuum (in Hg)		Canister Details	
		Start		Initial		Canister ID #	
		End		Final		Flow Controller #	

Canister Pressure Check

Time							
Vacuum (in Hg)							

Sample Type: Soil-Gas \_\_\_\_ Sub-Slab \_\_\_\_ Indoor \_\_\_\_ Ambient \_\_\_\_ Other \_\_\_\_      Timeframe: 24-Hr \_\_\_\_ 8-Hr \_\_\_\_ Grab \_\_\_\_      Canister Type: 6L Summa \_\_\_\_ 1L Summa \_\_\_\_ Other \_\_\_\_

Notes: \_\_\_\_\_ Sample Height / Depth (ft.): \_\_\_\_\_ Analytical Method: TO-15 \_\_\_\_ TO-15 SIM \_\_\_\_ Shortlist \_\_\_\_\_